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NORTH AMERICAN CAVE MILLIPEDS.

II. AN UNUSUAL NEW SPECIES (DORYPETALIDAE)  
FROM SOUTHERN CALIFORNIA, AND NEW RECORDS  
OF *SPEODESMUS TUGANBIUS* (TRICHOPOLYDESMIDAE)  
FROM NEW MEXICO <sup>1</sup>

By

William A. Shear  
Department of Zoology, University of Florida,  
Gainesville, Florida 32601

The information presented below is being published because of the unusual significance of the animals involved. Additional information on North American cave millipeds may be found in Shear, 1969 (key and summary) and in Shear, 1972 (revision of the family Cleidogonidae). Another paper on Mexican cave millipeds is now in press which incorporates a good deal of new information (Shear, in press).

I thank Mr. Thomas Briggs, Research Associate, California Academy of Sciences, San Francisco, California, and Mr. W. C. Welbourn, Albuquerque, New Mexico, for sending the specimens on which this paper is based. Mr. Welbourn also supplied valuable information on the extent of karst and gypsum areas in New Mexico.

Family DORYPETALIDAE Verhoeff

It has been suggested that this family name be used for at least some of the American species of Callipodida. The family name Lysiopetalidae is a junior objective synonym of

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<sup>1</sup>A generic synopsis of cave millipeds (Shear, 1969) formed Part I of this series.

the family name Callipodidae (Hoffman and Lohmander, 1964), and the North American species usually grouped as 'lysiopetalids' do not seem to be confamilial with the European group (typified by *Callipus foetidissimus* (Savi)). Thus no harm is done by using the name Dorypetalidae until a definitive study either confirms or rejects the relationship of the North American species to species of *Dorypetalum*. A reinterpretation (see below) of the gonopods of species of *Colactis* tends to confirm the relationship.

Genus *COLACTIS* Loomis

*Colactis* LOOMIS, 1937, Proc. U. S. Nat. Mus., vol. 84, p. 120. Type species, *C. saxetana* Loomis.

*Colactis briggsi* Shear, new species.  
(Figures 1-3.)

TYPES. Male holotype and male paratype from Shoshone Cave, near Shoshone, Inyo County, California, collected 28 December 1971, by Thomas Briggs. Types deposited in California Academy of Sciences, San Francisco, California.

DIAGNOSIS. Distinct from any other species of *Colactis*, and resembling species of the genus *Heptium* in having the transition to the full number of segmental crests on segment 18, rather than on segment 16 or 17, as is usual in species of *Colactis*. The secondary crests are nearly obsolete and extremely difficult to observe. Distinct from species of *Heptium* in that leg 7 of the male is of normal size and lacks a coxal process.

DESCRIPTION. Male holotype. Length, 22 mm.; width, about 1.5 mm.; 57 segments (paratype with 58 segments); 40-45 black ocelli in irregular rows in roughly pentagonal eyepatch. Antennae moderately long, of typical form for genus. Collum with 10 low crests, 10 setae near anterior edge of segment. Segments 2-17 also with 10 primary crests, transition to 12 primary crests occurs on segment 18. Primary crests large, occupying full length of metazonite, edges finely and irregularly serrate; pore crests largest, pore in distinct rimmed depression on broad upper surface of crest. Dorsal secondary crests nearly obsolete, scarcely visible under strong oblique lighting; lateral secondary crests larger, occupying distal half of metazonite. All segmental setae in anterior position on segments 1-4; all but median pair in posterior position on segment 5; all setae in posterior position on following segments.

Legs typical for genus. Coxal sacs strongly exerted on legpairs 3-5 in both holotype and paratype. Tarsal pads lacking. Legpair 7 unmodified, of normal size.

Gonopods (figs. 1, 2, 3) resembling most closely those of *C. saxetana* Loomis, from near Tucson, Arizona. The following interpretation of the gonopods follows that of Hoffman (1954) for *C. loomisi* Hoffman, with some modification from Hoffman and Lohmander (1964). In mesal view of

left gonopod (fig. 1), coxa (Hoffman, 1954) or mesal piece of coxosternum (mcs) (Hoffman and Lohmander, 1964) erect, subtriangular, separated at midline from lateral homolog, extending laterad as thin, chitinized band, not apparently connected to coxal or coxosternal process (cp) with globular base. Large, cupped basal piece (lcs) visible in lateral view (fig. 2) may be either prefemur (Hoffman, 1954) or lateral piece of coxosternum (Hoffman and Lohmander, 1964). Prefemoral process (pfp) blunt, setose, not clearly fused to supposed prefemur. Acropodite slightly sinuous, ending in plate-like tibiotarsus (t) and 3-pronged solenomerite(s).

Coloration uniform light horn brown to pale testaceous, anterior segments and head lightly reticulated purplish brown.

Female unknown.

DISTRIBUTION. Known only from the type locality.

NOTES. The type locality has been thoroughly described by Briggs and Hom (1972), and is a small cave located in saltbush desert with a thermal spring at the bottom, which keeps the temperature and humidity at uniformly high levels. A tropical relict schizomid, probably a troglobite, *Trithyreus shoshonensis*, has been described from Shoshone Cave by Briggs and Hom (1972). It is not clear at this time whether *Colactis briggsi* is a true troglobite or not. Other species of *Colactis* are known from Arizona, and a single, apparently specialized species has been described (Hoffman, 1954) from Durango, Mexico. *C. briggsi* is probably the most primitive member of the genus and seems to be a relict of a stock that was ancestral to the genera *Heptium* and *Colactis*. The intermediate nature of the species is summarized below:

<u>Heptium</u>	<u>Colactis</u>	<u>C. briggsi</u>
10 crests on seg. 1	10 crests on seg. 1	10 crests on seg. 1
legs with 8 segs.	legs with 8 segs.	legs with 8 segs.
secondary crests present but short	secondary crests present but short	secondary crests nearly absent
crest transition on segs. 18 or 19	crest transition on segs. 16 or 17	crest transition on segment 18
no species with tarsal pads	tarsal pads present in 2 of 7 species	tarsal pads absent
male leg 7 reduced in size, with coxal process	male leg 7 normal	male leg 7 normal

Thus in addition to its own specializations, *C. briggsi* combines, in a perhaps primitive form, the major diagnostic features of the genera *Heptium* and *Colactis*. The gonopods of *C. briggsi*, however, are clearly those of a *Colactis*, and are very similar in almost every detail to those of *C. sawetana*. The apparent relict nature of *C. briggsi*, the reduced pigment (all other species of *Colactis* are heavily pigmented, nearly black), and the harsh nature of the environment surrounding Shoshone Cave lead me to believe that the species might well be limited to the cave, and be in effect troglobitic, even though it lacks the striking anatomical specializations of some of its troglobitic relatives.

The description of gonopod anatomy given by Hoffman (1954) for *Colactis loomisi* does not appear to be entirely satisfactory. I was unable to observe the sclerotized band Hoffman (1954) described as the sternum, and the setose, lobe-like prefemoral process is not directly connected in *C. briggsi* to the large, curved basal structure Hoffman refers to as the prefemur. In a paper on the Callipodida of Turkey, Hoffman and Lohmander (1964) gave another interpretation of dorypetalid gonopods. Here, the portions described separately as coxa, prefemur, and sternum for *Colactis loomisi* are regarded as a coxosternum with median and lateral portions. The prefemur is then regarded as an essentially indistinguishable part of the telopodite giving rise to the prefemoral process. This interpretation is more satisfactory. Undoubtedly, the lateral part of the coxosternal structure is also contributed to by the tracheal apodemes. I have labelled figures 1 and 2 according to the Hoffman-Lohmander interpretation.

A long, pointed, articulated coxal process is described by Hoffman (1964) in *Colactis loomisi*, but is not pictured by Loomis (1937) for other species of *Colactis*, and I could not detect one in specimens of *Colactis quadrata* or *C. baboquivari*. However, in *C. briggsi*, this process seems to be present, although very much reduced and lying in the seminal groove on the telopodite (fig. 2, cp). The very light sclerotization of the gonopods in *C. briggsi* makes observations difficult. This process seems to me to be a probable homolog of the coxal solenite of certain Polydesmida. If this is so, then the presence of the solenite may be primitive and those families lacking it (*i. e.*, Rhachodesmidae) may indeed be advanced rather than primitive.

Only one pair of legs has been modified to form gonopods in the Callipodida. What Loomis (1937) and Buckett and Gardner (1969) have called "anterior gonopods" in species of *Tynomma* are actually the large median portions of the coxosterna.

## Family TRICHOPOLYDESMIDAE Verhoeff

I recently published a note (Shear, 1973) on the usage of this family name. Now, after examining more material from both the Appalachian region and the Pacific Northwest, I am unsure as to the homogeneity of the species traditionally grouped under this family name in the United States. The name Trichopolydesmidae has unfortunately become synonymous with the concept "small, unpigmented polydesmoid with spatulate dorsal setae." R. L. Hoffman (personal communication) feels that the Appalachian species grouped in *Chaetaspis* are probably not confamilial with the European species of *Trichopolydesmus*, but are related instead to the Nearctodesmidae. In fact, when the tropical forms are considered, there may be several family-level groups involved in our present concept. But at this time, as long as it is clear what the application of the name Trichopolydesmidae means, no further confusion is engendered by its use.

Genus *SPEODESMUS* Loomis

- Speodesmus* LOOMIS, 1939, Bull. Mus. Comp. Zool., vol. 86, p. 187; SHEAR, 1969, Psyche, vol. 76, p. 134.  
*Speorthus* CHAMBERLIN, 1952, Ent. News, vol. 63, p. 12;  
 LOOMIS, 1960, J. Kansas Ent. Soc., vol. 33, p. 66;  
 SHEAR, 1969, Psyche, vol. 76, p. 134.

NEW SUBJECTIVE SYNONYMY. The synonymy of *Speorthus* with *Speodesmus* has been suggested by Loomis (1960) and is here formalized. The genus consists of troglobitic, mostly 20-segmented species, occurring in Texas, New Mexico, and the Mexican state of Nueva Leon (this last is an undescribed, highly specialized 19-segmented species, a description of which will appear in my forthcoming study of Mexican cave millipeds). *Speodesmus* is clearly related to *Bidentodon*, a genus with two 19-segmented species in California (Shear, 1972), and more distantly to *Harpogonopus* of southern California and Baja California, Mexico, and *Antriadesmus* of the eastern United States. *Bidentodon* species have heretofore represented a somewhat anomalous group among North American 'trichopolydesmids,' but it now seems that species of *Speodesmus* link them with the more typical forms. The mesal branch of the gonopod is simple and rodlike in *Bidentodon* and not set off sharply from the rest of the gonopod. In species of *Speodesmus*, this branch is divided, with a lamella-like proximal part and a distal spur, but is rather small. In *Antriadesmus*, *Harpogonopus*, *Oodedesmus*, and *Phreatodesmus*, the mesal branch is large, often larger than the lateral branch, and may be very complex (Loomis, 1960, illustrations).

*Speodesmus tugarbius* (Chamberlin).  
(Figures 4-8.)

*Speorthus tugarbius* CHAMBERLIN, 1952, Ent. News, vol. 63, p. 12, no figs.; LOOMIS, 1960, J. Kansas Ent. Soc., vol. 33, p. 67.

Holotype from Carlsbad Caverns, New Mexico, not examined, in R. V. Chamberlin collection.

DIAGNOSIS. Distinct from other described species of *Speodesmus* in the greatly enlarged legs of the male (fig. 5); in the other species the male legs are only slightly larger than those of the female.

DESCRIPTION OF MALE FROM HARVEY'S CAVE. Length, about 9.5 mm.; width, about 0.86 mm. Head large, broader than collum, setose. Antennae typical, segments strongly clavate, segment 6 the largest, with accessory sensory setae. Collum broadly oval, with about three rather irregular rows of short, clavate setae, two marginal teeth on each side. Typical midbody poriferous segment (segment 5, fig. 4) with pore callus not much enlarged, 5 marginal teeth subtended by setae, 5 transverse rows of setae, about 10-14 setae in each row. Nonporiferous midbody segments (segment 6, fig. 4) with 4 marginal teeth and setae, 4 transverse rows of setae, sometimes a few short setae anterior to first row near anterior margin of metazonite. Legs greatly and strikingly enlarged, clavate, prefemur bulbous (fig. 5), tarsus arched, tarsal claw strong.

Gonopod (figs. 7,8) typical of genus. Coxa subglobular, strongly flattened on mesal sides, closely appressed in situ. Long, thin coxal solenite lies in shallow depression. Prefemoral portion smooth, few small setae on posterior side. Acropodite with two divisions; lateral accessory division longest, subdivided into lateral and mesal branches. Mesal division of acropodite carries seminal canal, consists of basal lamella and strong distal spur.

Body completely without pigment, but strongly sclerotized.

DESCRIPTION OF FEMALE FROM HARVEY'S CAVE. Length, about 8.8 mm.; width, about 0.65 mm. Body much more slender than in male, head appearing proportionally larger. Legs (fig. 6) much shorter and more slender than in male.

DISTRIBUTION. Known from the type locality, the following localities in New Mexico, and in extreme western Texas (Mitchell and Reddell, 1972). NEW MEXICO: Lincoln Co.: Ft. Stanton Cave, nr. Ft. Stanton, ca. 20 mi. SE. of Carrizozo, 22 December 1971, W. C. Welbourn, ♂♀; De Baca Co.: Triple Engle Pit, near Chaves Co. line, ca. 15 mi. SW. of Dunlap, 28 December 1972, W. C. Welbourn, ♂♀; Socorro Co.: Harvey's Cave, 18.2 mi. N., 5.3 mi. W. of Carrizozo, 1 July 1972, W. C. Welbourn, ♂♂♀♀.

NOTES. *S. tujanbius* will probably be found to occur in many of the caves of the gypsum plain of eastern New Mexico, and in the karst areas of the Capitan-Sacramento-Guadalupe mountain system of New Mexico and west Texas.

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FIGURES 1-3. *Colactis briggsi*. Figure 1. Right gonopod, mesal view. Figure 2. Right gonopod, lateral view. Figure 3. Tip of right gonopod, posterior view. FIGURES 4-8. *Speodesmus tunganbius*. Figure 4. Right paranota of segments V and VI, dorsal view. Figure 5. Right leg 15 of male, posterior view. Figure 6. Right leg 15 of female, posterior view. Figure 7. Left male gonopod, mesal view. Figure 8. Tip of mesal accessory branch of male gonopod. 



